VI. CLAIMS

I claim:

1. A method of flow cytometry, comprising the steps of:
   a. obtaining sperm cells of a male of a species of mammal;
   b. injecting said sperm cells into a fluid stream at an injection point;
   c. forming a plurality of droplets in said fluid stream;
   d. entraining one each of said sperm cells in a portion of said plurality of droplets;
   e. analyzing sperm cells in said portion of said plurality of droplets;
   f. discriminating between said sperm cells to generate two populations based upon at least one sperm cell characteristic; and
   g. adjusting said injection point of said sperm cells in said fluid stream to increase resolution of said at least two populations of said sperm cells.

2. A method of flow cytometry as described in claim 1, wherein said male of said species of mammal is selected from the group consisting of a bovine species of mammal, an equine species of mammal, a ovine species of mammal, a canine species of mammal, a feline species of mammal, swine species of mammal, a marine species of mammal, a deer species of mammal.

3. A method of flow cytometry as described in claim 1, wherein said fluid stream comprises a sheath fluid.

4. A method of flow cytometry as described in claim 3, wherein said sheath fluid comprises a sheath fluid selected from the group consisting of a sheath fluid containing a citrate buffer, a phosphate buffer, a HEPES buffer.

5. A method of flow cytometry as described in claim 1, wherein said step of obtaining sperm cells of a male of a species of mammal comprises obtaining sperm cells of a first species of mammal and obtaining sperm cells of a second species of mammal and wherein said step of adjusting said injection point of said sperm cells in said fluid stream to increase resolution of said at least two

populations of said sperm cells comprises establishing a first injection point of said sperm cells of said first species of mammal at a first location within said fluid stream to increase resolution of said at least two populations and establishing a second injection point of said sperm cells of said second species of mammal at a second location within said fluid stream to increase resolution of said at least two populations.

6. A method of flow cytometry as described in claim 1, wherein said step of adjusting said injection point of said sperm cells in said fluid stream to increase resolution of said at least two populations of said sperm cells comprises adjusting position at which a particle injector introduces said sperm cell into said fluid stream.

7. A method of flow cytometry as described in claim 1, wherein adjusting position at which a particle injector introduces said sperm cell into said fluid stream comprises providing a slidly adjustable coupling between said particle injector and a nozzle body.

8. A method of flow cytometry as described in claim 1, wherein adjusting position at which a particle injector introduces said sperm cell into said fluid stream comprises operating a mated pair of spiral threads between said particle injector and said nozzle body.

9. A method of flow cytometry as described in claim 1, wherein said step of adjusting said injection point of said sperm cells in said fluid stream to increase resolution of said at least two populations of said sperm cells comprises replacing said particle injector with a second particle injector to alter distance between said injection point of said sperm cells into said fluid stream and said nozzle orifice through which said fluid stream flows.

10. A method of flow cytometry as described in claim 1, wherein said step of adjusting said injection point of said sperm cells in said fluid stream to increase resolution of said at least two populations of said sperm cells comprises adjusting

distance between said injection point of said sperm cells into said fluid stream and a nozzle orifice through which said fluid stream flows.

11. A method of flow cytometry as described in claim 1, wherein said fluid stream has fluid stream characteristics and wherein said step of adjusting said injection point of said sperm cells in said fluid stream to increase resolution of said at least two populations of said sperm cells comprises adjusting said injection point of said sperm cells based upon said fluid stream characteristics.

12. A method of flow cytometry as described in claim 1, wherein said fluid stream has altered fluid stream characteristics and wherein said step of adjusting said injection point of said sperm cells in said fluid stream to increase resolution of said at least two populations of said sperm cells comprises adjusting said injection point of said sperm cells based upon said altered fluid stream characteristics.

13. A method of flow cytometry as described in claim 1, further comprising the step of separating said sperm cells into first population of sperm cells and a second population of sperm cells.

14. A method of flow cytometry as described in claim 1, wherein said step of discriminating between said sperm cells to generate two populations based upon at least one sperm cell characteristic comprises discriminating between said sperm cells based upon a sex characteristic, and wherein said first population of sperm cells bear an X-chromosome and said second population of sperm cells bear a Y-chromosome.

15. A flow cytometer, comprising:

a. a fluid stream;

b. a nozzle body in which said fluid stream flows;

c. a nozzle orifice at which said fluid stream exits said nozzle;

d. a particle source;

e. a particle injector fluidicly coupled to said particle source which entrains at least one particle at a location in said fluid stream; and

f. a selectably variable adjustment element to alter distance between said nozzle orifice and said location in said fluid stream at which said particle injector entrains said at least one particle.

16. A flow cytometer as described in claim 15, wherein said particle comprises a cell.

17. A flow cytometer as described in claim 15, wherein said particle comprises a sperm cell.

18. A flow cytometer as described in claim 15, wherein said sperm cell is obtained from a male of a species of mammal selected from the group consisting of a bovine species of mammal, an equine species of mammal, a ovine species of mammal, a canine species of mammal, a feline species of mammal, swine species of mammal, a marine species of mammal, a deer species of mammal.

19. A flow cytometer as described in claim 15, wherein said selectably variable adjustment element to alter distance between said nozzle orifice and said location in said fluid stream at which said particle injector entrains said at least one particle comprises slidly adjustable engagement between said particle injector and said nozzle.

20. A flow cytometer as described in claim 15, wherein said selectably variable adjustment element to alter distance between said nozzle orifice and said location in said fluid stream at which said particle injector entrains said at least one particle comprises a pair of mated spiral threads engaged between said particle injector and said nozzle.

21. A flow cytometer as described in claim 15, wherein said selectably variable adjustment element to alter distance between said nozzle orifice and said location in said fluid stream at which said particle injector entrains said at least one particle comprises replacement of said particle injector with a second particle injector which entrains said at least one particle at a second location in said fluid stream.

22. A flow cytometer, comprising:

a. a fluid stream;

b. a nozzle body in which said fluid stream flows;

c. a nozzle orifice at which said fluid stream exits said nozzle;

d. a particle source;

e. a particle injector fluidicly coupled to said particle source which entrains at least one particle at a selectably variable location in said fluid stream.

23. A flow cytometer, comprising:

a. a fluid stream;

b. a nozzle body in which said fluid stream flows;

c. a nozzle orifice at which said fluid stream exits said nozzle;

d. a particle source;

e. an adjustable particle injector fluidicly coupled to said particle source which entrains at least one particle from said particle source at a location in said fluid stream, wherein adjustment of said particle injector alters distance between said nozzle orifice and said location in said fluid stream at which said particle injector entrains said at least one particle.

24. A flow cytometer, comprising:

a. a fluid stream;

b. a nozzle body in which said fluid stream flows;

c. a nozzle orifice at which said fluid stream exits said nozzle;

d. a particle source;

e. a conduit which fluidicly couples said particle source to said nozzle body;

f. a particle injector coupled to said conduit which entrains at least one particle at a location in said fluid stream; and

g. a selectably variable adjustment element to alter distance between said nozzle orifice and said location in said fluid stream at which said particle injector entrains said at least one particle.

25. A flow cytometer, comprising:

a. a nozzle having a nozzle orifice;

b. a particle injector adjustably positional within said nozzle, whereby positional adjustment of said particle injector alters distance between injection point of said particle injector and said nozzle orifice.

26. A method of flow cytometry, comprising the steps of:

a. generating a fluid stream within a nozzle;

b. discharging said fluid stream from a nozzle orifice;

c. establishing a particle injection point in said fluid stream a distance from said nozzle orifice;

d. entraining cells in said fluid stream at said injection point;

e. adjusting position of a particle injector within said nozzle;

f. analyzing said cells based upon at least one cell characteristic;

g. adjusting position of a particle injector within said nozzle.